

REMARKS

Claims 64, 68 and 76 are amended. Claims 67, 78, 85 and 86 are cancelled. New claims 87-94 are added. Claims 64-66, 68, 70-77, 79-81, 83-84 and 87-94 are pending in the application.

Claims 70, 72 and 73 stand objected to as being substantial duplicates. The Examiner states that claims 70 and 72 are exact duplicates. Claim 70 recites a material comprising silicon and carbon. Claim 72 recites a material comprising silicon, oxygen and carbon. Clearly a material can comprise silicon and carbon as recited in claim 70 without comprising oxygen as recited in claim 72. Accordingly, the Examiner's statement with respect to claim 70 and 72 being exact duplicates is improper.

Claim 73 recites a material that consists essentially of silicon, oxygen and carbon. As set forth in the MPEP at § 2111.03, the transitional phrases "comprising" and "consisting essentially of" define the scope of a claim with respect to what unrecited additional components are excluded from the scope of the claim. It is well recognized that the scope of a claim reciting the transitional phrase "comprising" is different in scope relative to a claim reciting the transistional phrase "consisting essentially of". Accordingly, the Examiner's objection to claims 70, 72 and 73 as being substantial duplicates is improper.

The Examiner has similarly objected to claims 60 and 62, 74 and 75, 83 and 84 and claims 85 and 86. Claims 60 and 62 were cancelled in a previous response and are no longer pending in the application. For reasons unrelated

to the Examiner's objection, claims 85 and 86 are cancelled (see below). The Examiner's double patenting objection to claims 74, 75, 83 and 84 is improper for reasons similar to those discussed above with respect to claims 70, 72 and 73. Accordingly, applicant respectfully requests withdrawal of the Examiner's double patenting objection to claims 70, 72, 73, 74, 75, 80 and 83 in the Examiner's next action.

Pending claims 64-66, 68, 70-77, 79-81 and 83-84 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over applicant's admitted prior art (AAPA) as combined with one or more of Spuler et al., U.S. Patent No. 5,935,873; Nobuhisa, JP 10-223758 and McAnally, U.S. Patent No. 6,136,700. The Examiner is reminded by direction to MPEP § 2143 that a proper obviousness rejection has the following three requirements: 1) there must be some suggestion or motivation to modify or combine references teachings; 2) there must be a reasonable expectation of success; and 3) the combined references must teach or suggest all of the claim limitations. Pending claims 64-66, 68, 70-77, 79-81 and 83-84 are allowable over the various cited combinations of Spuler, AAPA, Nobuhisa and McAnally for at least the reason that the cited references, either individually or as combined, fail to teach or suggest each and every limitation in any of those claims.

As amended, claim 64 recites sidewall spacers extending along sidewalls of conductive gates, the spacers being essentially free of nitrogen and having thicknesses of less than or equal to about 500Å. The amendment to claim 64 is supported by the specification at, for example, page 20, lines 14-22. The

applicant's admitted prior art does not disclose or suggest the claim 64 recited sidewall spacers having thicknesses of less than or equal to about 500Å and being essentially free of nitrogen. Spuler discloses incorporation of carbon into at least a portion of a nitride layer to provide carbonized nitride for reducing a nitride etch rate (col 2, Ins 49-55). Spuler does not disclose or suggest the recited sidewall spacers having thicknesses of less than or equal to about 500Å and being essentially free of nitrogen.

McAnally discloses a stopping layer that can comprise carbon rich nitride, silicon rich oxide, silicon carbide, carbon rich oxide or nitrated oxide formed over sidewall spacers (col 5, Ins 9-18 and Figs. 1B-1F). McAnally does not disclose or suggest the claim 64 recited sidewall spacers having thicknesses of less than or equal to about 500Å and being essentially free of nitrogen. Nobuhisa does not disclose or suggest sidewall spacers. As combined, applicant's admitted prior art, Nobuhisa, McAnally and Spuler fail to disclose or suggest the claim 64 recited sidewall spacers having thicknesses of less than or equal to about 500Å and being essentially free of nitrogen.

Dependent claim 67 is cancelled. Dependent claims 65-66 are allowable over the cited combinations of Spuler, AAPA, Nobuhisa and McAnally for at least the reason that they depend from allowable base claim 64.

As amended, independent claim 68 recites a first electrode comprising conductively doped silicon extending within an insulative layer, at least a portion of the first electrode extending along and against a material that comprises from about 2% to about 20% carbon, by weight. The amendment to claim 68 is

supported by the specification at, for example, page 4, lines 13-18 and page 19, lines 11-19. Applicant's admitted prior art does not disclose or suggest the claim 68 recited material comprising from about 2% to about 20% carbon, by weight. Spuler discloses forming an oxide layer on the surface of a carbonized layer (col 3, Ins 22-25), forming a contact opening in the oxide layer (col 3, Ins 36-38) and subsequently filling the contact opening with one or more of tungsten, aluminum and copper (col 4, Ins 2-5). Spuler does not disclose or suggest the claim 68 recited first electrode comprising conductively doped silicon extending within an insulative layer and along and against a material that comprises from about 2% to about 20% carbon, by weight.

McAnally discloses etching through a stopping layer and forming a conductive material in a contact region to form a self-aligned contact (col 5, Ins 30-32). McAnally does not disclose or suggest the recited first electrode comprising conductively doped silicon extending along and against a material that comprises from about 2% to about 20% carbon. Nobuhisa discloses formation of a contact hole and forming a tungsten conductor within the contact opening (§ 49 and 50). Nobuhisa does not disclose or suggest the recited first electrode comprising conductively doped silicon, at least a portion of the first electrode extending along and against a material that comprises from about 2% to about 20% carbon, by weight. As combined, AAPA, Spuler, Nobuhisa and McAnally fail to disclose or suggest the claim 68 recited first electrode comprising conductively doped silicon wherein at least a portion of the first electrode extends along and against a material that comprises from about 2% to about 20%

carbon, by weight. Accordingly, claim 68 is allowable over the cited combination of references.

Claims 70-75 are allowable over the cited combinations of AAPA, Spuler, McAnally and Nobuhisa for at least the reason that they depend from allowable base claim 68.

As amended, independent claim 76 recites a carbon-containing material proximate wordlines, the carbon-containing material comprising from about 2% to about 20% carbon and being essentially free of nitrogen. Independent claim 76 is allowable for reasons similar to those discussed above with respect to claim 64.

Claims 78, 85 and 86 are cancelled. Dependent claims 77, 79-81 and 83-84 are allowable over the cited combinations of AAPA, Spuler, Nobuhisa and McAnally for at least the reason that they depend from allowable base claim 76.

New claims 87-94 do not add new matter to the application since each is fully supported by the specification as originally filed. Claims 87-94 are supported by the specification at, for example, page 20, line 3 through page 21, line 22; and Figs. 8 and 9.

For the reasons discussed above, claims 64-66, 68, 70-77, 79-81 and 83-84 are allowable and claims 87-94 are believed allowable. Accordingly, applicant respectfully requests formal allowance of claims 64-66, 68, 70-77, 79-81, 83-84 and 87-94 in the Examiner's next action.

Respectfully submitted,

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Inventor John T. Moore
Assignee Micron Technology, Inc.
Group Art Unit 2813
Examiner Kielin, E.
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VERSION WITH MARKINGS TO SHOW CHANGES MADE ACCOMPANYING
RESPONSE TO MARCH 6, 2002 FINAL ACTION AND RCE FILING

In the Claims

The claims have been amended as follows. Underlines indicate insertions and ~~strikeouts~~ indicate deletions.

64. (Amended) A wordline construction, comprising:
a conductive gate having sidewalls; and
sidewall spacers extending along the sidewalls of the conductive gate, the
sidewall spacers being essentially free of nitrogen and having thicknesses of less
than or equal to about 500Å.

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68. (Amended) A capacitor construction, comprising:

a ~~storage node~~ first electrode extending within an insulative layer, the first electrode comprising conductively doped silicon; at least a portion of the ~~storage node~~ first electrode extending along and against a material that comprises from about 2% to about 20% carbon (by weight);

a second electrode proximate the ~~storage node~~ first electrode; and

a dielectric layer between the second electrode and the ~~storage node~~ first electrode.

76. (Amended) A DRAM construction, comprising:

a pair of wordlines over a substrate, the wordlines comprising sidewall edges;

sidewall spacers extending along the sidewall edges of the wordlines;

three nodes proximate the wordlines, the three nodes comprising a first node, second node and third node, the second node being in gated electrical connection with the first node through one of the wordlines and being in gated electrical connection with the third node through the other of the wordlines;

a carbon-containing material proximate the wordlines, the carbon-containing material comprising from about 2% to about 20% carbon, and being essentially free of nitrogen;

an insulative layer over the ~~etch stop~~ carbon-containing material;

a first capacitor construction in electrical connection with the first node, the first capacitor construction comprising a first storage node;

a second capacitor construction in electrical connection with the third node, the second capacitor construction comprising a second storage node; and

a bit line contact in electrical connection with the second node, at least one of the first storage node, second storage node and bit line contact being in physical contact with the carbon-containing material.

87. (New) A semiconductor construction comprising:

a semiconductor substrate;

a pair of conductive gates over the substrate, the conductive gates having sidewalls;

a node location between the pair of conductive gates;

a carbon-containing material extending along the sidewalls of the wordlines;

and

an insulative material over the wordlines and over at least some of the carbon-containing material, at least a portion of the insulative material being directly against the wordlines.

88. (New) The semiconductor construction of claim 87 further comprising:

an opening in the insulative material between the pair of wordlines, the opening having a base comprising a surface of the substrate; and

a capacitor construction within the opening and directly against the surface of the substrate.

89. (New) The semiconductor construction of claim 87 wherein the carbon containing material comprises from about 2% to about 20% carbon (by weight).

90. (New) The semiconductor construction of claim 89 wherein the carbon-containing material further comprises silicon and oxygen.

91. (New) The semiconductor construction of claim 89 wherein the carbon-containing material consists essentially of silicon, oxygen and carbon.

92. (New) The semiconductor construction of claim 89 wherein the carbon-containing material further comprises silicon and nitrogen.

93. (New) The semiconductor construction of claim 89 wherein the carbon-containing material consists essentially of silicon, nitrogen and carbon.

94. (New) The semiconductor construction of claim 87 wherein the carbon-containing material is shaped into sidewall spacers having a thicknesses of less than or equal to about 500 Å.

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